

DEVELOPING DIGITAL CHINESE WATER-INK ANIMATION
Renaissance of Chinese Water-ink Animation: Digital Art with a Focus on Realistic
Interactions Between Water-Ink and Rice Paper

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Abstract**DEVELOPING DIGITAL CHINESE WATER-INK ANIMATION**

Renaissance of Chinese Water-ink Animation: Digital Art with a Focus on Realistic
Interactions Between Water-Ink and Rice Paper

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Michael G Wagner, Ph. D.

In this paper we present an introduction to Chinese water-ink animations and an exploration of the style and technique that defines an animation as Chinese water-ink. Building upon these traditional techniques we introduce new digital styles to reconstruct important elements of water-ink animation within a virtual environment. Specifically we explore the addition of rice paper as an element within the digital and suggest new ways in which digital Chinese water-ink animation might grow in the future.

1. Introduction

Water-Ink painting is a Chinese traditional art and is considered the most representative style of Chinese art [24]. In the 1960's, water-ink style animation was created during a Chinese period of animation industry prosperity, and the style grew from obscurity to be easily recognized in the world of animation [17]. Ironically, as world interest in Chinese animation was growing, at home, development of animation was being stymied by political change. The situation was made more complicated by a growing interest in foreign animation that continued into the end of 1980s. At that time, Chinese interest in traditional ink painting began to wane [25]. In comparison of the prosperity period of Chinese animation industry in the 60s and 80s, today China's animation is at its development stagnation period. Money becomes an important constraint of the animation industry, discouraging the true development in the art of animation.

As we enter into the 21st century, Chinese water-ink animation has been showing signs of revival and may regain its prominence through globalization and modernization. With technology advancing across the globe, Chinese water-ink animation has been adapted and tailored to fit in digital world. Digital water-ink animations produced in the style of traditional Chinese ink painting provide excellent examples of how technology has merged with old media. Currently, there has been international teams and individuals using the digital technology production in water-ink animation. A few pieces were recognized by the international media. For example, both *Ode to Summer* (2003) and *INK* (2009) digital water-ink animation focuses on the relationship between ink and water, using 3D software

to simulate the effects of ink in water with non-rice paper background to create the style of water-ink animation.

However, after investigation on water-ink painting and water-ink animation's history, rice paper stands as an important status in the art of water-ink works. As for the painting, the four primary tools are Brushes, Chinese ink, rice paper, and Ink Slab, which are called the "four treasures" in study. Chinese scholar Moruo Guo describes the relationship between rice paper and painting is that: "rice paper is an artistic invention created by the Chinese labor working people, Chinese calligraphy and painting cannot be separated with rice paper or it would lose its artistic charm." Prodigious painting master Daqian Zhang has praised that, "rice paper is the lifeline of the traditional Chinese painting". In addition, another well-known Chinese painter, Baoshi Fu, consider "rice paper as an important element in tradition Chinese painting. which is the most excellent materials among all the calligraphy and painting, possibly even the most dominating element of representing traditional Chinese art. [6]" Therefore, I believe that through the development of digital water-ink animation, these traditional elements should have been kept. Thus, my thesis explores digital water-ink animation of the style with rice paper background, focus on the effects of ink spread on the paper.

2. The appearance of Chinese water-ink animation

This chapter will introduce the history of Chinese animation industry, and the appearance of Chinese water-ink animations and how Chinese politics influenced its growth and development.

2.1 History of Chinese Animation Industry

The appearance and development of Chinese water-ink animation are closely related to Chinese politics. Many history books and theses centering on the topic of ink animation often teach by using significant historical events in China. According to JiLin Art College's Animation History Around the World 1879 2002, Chinese animation can be separated into six time periods.

1. 1922 to 1945 is the early stage and era of discovery 2. 1946 to 1956 is the stabilization period of Chinese animation 3. 1957 to 1965 is the prosperity period of Chinese animation 4. 1966 to 1976 is the darkest period of Chinese animation (Cultural Revolution) 5. 1976 to 1989 is the Second prosperity period of Chinese animation 6. 1990 to present is the mass expansion of the Chinese animation industry [8]

In Animation in China chapter 1- Animation in Asia, Lent uses major historical events as guidelines to the development of Chinese animation. The period before the establishment of People's Republic of China; Early days of establishment; Golden Age of Chinese Animation, Culture Revolution (the darkest period of Chinese animation) and Post Cultural Revolution and Opening (Second prosperity period of Chinese animation) [15].

The years 1922 - 1945 marked the early age, an age of animation exploration. In 1918, the first American animation film *Out of the Inkwell* was introduced in China. During that time, American animation had high recognition; therefore, many Chinese were interested in learning animation production [22]. *Shuzhendong Chinese Typewriter* 1922, by Wan Laiming and Wan Guchan is the first Chinese animation ever made. In the next few decades, Chinese animation addressed various topics. In 1924, Zhonghua Film Company created the animation *Dog Treat*, and Shanghai Tobacco Company created *New Year*. These two films were among the earliest of Chinese animations in the history. However, they failed to make an impact and the film that really caught everyone's attention was the film *Studio Scene* created in 1926 by Wan brothers. In 1935, Wan brothers produced the first animation with sound: *The Camel's Dance* [8]. In 1941, they went on to make the first full feature length animation: *Princess Iron Fan*.

The years 1946 to 1956 were the stabilization period of Chinese animation. In 1946, China Northeast Film Studio was established in the Heilongjiang province. Their vision at the time was clear and their aim was to service the military and farmers. Their primary focus was to produce documentaries. In July of 1949, Northeast Film Studio formed a Meishu film team, headed by famous comic artist-TeWei [22].

Upon the formation of the People Republic of China, the government was initially very interested in the development of animations. The government assembled a twenty-man animation team and sent them to the Soviet Union to learn animation techniques. This team later became the China Northeast Film production crew, which was later moved to Shanghai and changed its name to Shanghai Animation Film Studio in 1957. This ended up being the only government sponsored animation studio before the economic reform [8].

During this time period, Chinese animation's creation and production had the following characteristics: in terms of topics, fairy tales were used to attract children and youth, *Cat Fishing* (1952) and similar animations were made. In terms of style, Minzu style was employed, creating puppetry films like *Magic Brush* (1955) and animation film like *The Proud General* (1956). In terms of technology, black and white films changed to color, and they produced the first color puppetry film in *China Litter Hero* (1953) and the first color traditional animation *Why is the Crow Black-Coated* (1955) [8].

The years 1957 to 1965 were the first prosperity period of Chinese animation. In 1957, Shanghai Animation Film Studio was created and it was the first independent studio to create Meishu films in China. Through guidelines of Let a hundred flowers blossom and a hundred schools of thought contend by Mao Zedong, artists were encouraged to produce different kinds of artworks. Animation production increased and overall aesthetic value and technology improved. Many films in this era won awards and accolades from international film festivals. The animation produced during this time period was constantly concerned with unique Chinese culture and was recognized globally as a legitimate movement. The Chinese animation movement sought to express artistic Minzu qualities.

At the same time period, world renowned classic *Havoc in Heaven* was produced. New films continued to flood the market: in 1958, the first Chinese paper-cut film *Piggy Eats Watermelon* was successfully made. In 1960, the first origami film *A Clever Duckling* was made. In 1961, the first ink animation *Tadpoles Looking for their Mum* was made [8].

In 1963, another water-ink animation *The Cowboy's Flute* was able to use ink to express characters, animals, and the environment, expanding the horizons of ink animation. In this roughly ten-year span, quite a lot of innovation happened in Chinese animation style. This

included paper-cut animation, water - ink animation, and puppet animation [10].

The years 1966 to 1976 were the Cultural Revolution. The revolution engulfed all of China and was the greatest catastrophe in terms of Chinese art. Between the years of 1965 to 1972, China did not produce a single animation. The entire crews of the Shanghai Animation Film Studio were assigned to farming and other forms of labor, halting all development of animation production. After the Cultural Revolution, the Shanghai Animation Film Studio created many more pieces of work, but the style remained fairly similar and stagnant [15].

In 1972, Shanghai Animation Film Studio was the first to resume production and they were able to produce 17 animations before the end of the revolution 1976. The films of this era like *Little Trumpeter* (1973), *Little 8th Route Army* (1973), *Little Sentinel of East China Sea* (1973), and water-ink with paper cut technique animation film *Bamboo Shoot Grown in the House* (1976) did not have many breakthroughs in terms of style or technology. These films were predominantly used as propaganda for the government.

1976 - 1989 was the second period of prosperity for Chinese animation. On October of 1976, the new leader of the Communist Party ended the ten years Cultural Revolution. Towards the end of 1978, China entered a period of Opening. This period is considered to be the most prosperous period for Chinese animation. During these 10 years, when the Reform and Opening period occurred, the Chinese government weaned the few existing studios from total state support, encouraging them to subcontract for overseas companies and become more commercially oriented, and greatly increased their production quota to satisfy the voracious programming appetites of the increased numbers of television stations [34].

In this period of China, after the 80's did television slowly become integrated into society, and Chinese interest surged in demand for animation. The country produced 219 animated films, generating large amount of high quality Chinese animation. This included water-ink animation works such as *The Deer's Bell*(1982), *Feeling From Mountain and Water* (1988)*The Fight Between the Snipe and Clam* (1983). *Feeling From Mountain and Water* is the last non-digital water-ink animation work in the Chinese animation history [8].

The authors of *World Animation History 1879-2002*, published by Jilin Art College, believes that in the post-1990's the stage was set for the Chinese animation industry to expand. However, this might actually be a lost period for Chinese animation development.

At the end of 1980's and early 1990's, commercial animation from Europe, North America and especially Japan was imported to China. The first imported foreign animation film *Astroboy* was shown on China Central Television on December 1980 [5]. Since this new type of animation could be mass-produced, it quickly took over the market. In Japan, the success of the theatrical versions of the *Yamato* and *Gundam* series were seen as the beginning of the anime boom of the 1980s, which many consider the beginning of the "golden age of anime". This anime boom also marked the beginning of "Japanese Cinema's Second Golden Age", which would last until around the beginning of the 2000s [12]. These animations that were created in Japan in the 80's, and were mass imported to China in the 90's.

In the 1990's, encouraged by competition from other countries, Chinese animations started a non-traditional path, using digital production techniques. During the digital age, Chinese animation traded the production of ethnic, art movies for the expansion and con-

tinuity of television animation. These larger productions include: *Lotus Lantern*, *Music Up*, *Haier Brothers*, *Heroes in Sui and Tang Dynasties*. However, these pieces are mostly imitation of foreign animation style and do not contain much of Chinese national/ethnic elements. For example, after the 90s, *Music Up* had an emphasis of Japanese anime look [13]. *Heroes in Sui and Tang Dynasties* only imitated the glamorous Japanese clothing and aesthetic appearance of the characters, but it does not establish unique characteristics with Chinese spirits and Minzu. *Lotus Lantern* completely follows the Walt Disney Animation Studios creative process and production, however, the film did not make a great impression to its audience [21]. During this period, Chinese animation is at the stage of imitation and begun losing their own of animation style.

Throughout the development of Chinese animation, among the most ethnic water-ink animation appeared during the developmental stage before the Cultural Revolution. During the Revolution, there was a hiatus in the development of Chinese animation. Thus, the production of water-ink animation did not appear again until after the Revolution. After the 1990's, a combination of government policies to stimulate TV animation production, social benefit, and business value, continued to stymie the production of water-ink animation [8].

2.2 Exploration of traditional style - Water-ink Animation

Two factors leading Chinese animators to explore cultural styles:

First: A concept raised by Mao Zedong concerned "Chinese style and spirit", an orthodoxy that has continued to dominate all fields of Chinese literature and arts [27]. This of course included animation as well.

Second: Due to the political climate, China learned animation from its Soviet expe-

rience and much of the animation style produced during this period had a heavy Soviet influence. For example, *Why Is the Crow Black-Coated*(1955), the first Chinese animation to be recognized internationally in 1956 at the Venice Film Festival and the judges mistook the film as a Soviet work.

Receiving many media reviews and much praise, this film is well remembered largely because it is similar to Soviet Union's animation [14]. Thus, it can also be interpreted as Chinese animation not having a style of its own at the time.

Under the influences of the two factors, in early 1957, Teweï, lead of Shanghai animation film studio, came up with the slogan "Roads to Minzu style"[27]. Chinese animation academies began to produce nationalist works such as *Magic Brush of Maliang*(1955) and *The Concerned General*(1957) [27], and artists in China have been looking for a way to translate water-ink paintings into animations. In January of 1960, Chen Yi, China's vice chair at the time, was shown three experimental Chinese ink animation films during the Chinese Animation Film Festival. After viewing the films *Fish/Shrimp*, *Frog*, and *Chicklet*, he was quoted as saying: If only you can make Qi Bai Shi's ink paintings come to life [31]." With political support, the first ink animation film *Tadpoles looking for their mom* was created and the Chinese animation movement began.

3. The Development of Water-Ink Animation

Water-ink painting is a Chinese traditional aesthetic that has been part of Chinese civilization for five thousand years [9]. Because of its unique drawing style, it is named as a national style and it represents the unique style of Chinese traditional arts. Water-ink animation is derived from the basics of ink painting. It is distinguished from other animations by its use of brushstrokes, ink pooling, and color gradients which create a much more complex image than simple solid colors. Therefore, in water-ink animation, outlines are often not completely solid and many other techniques of expression are derived from traditional ink paintings [3].

Creating water-ink animation film required a lot of time and strong financial support. In China it was a process that was only possible with the direct support of the Chinese government. During the production, every piece is painted by hand on transparent celluloids and then shot frame by frame by camera. For 10 minutes of animation, there needs to be about 7000 to 8000 paintings [23]. The celluloid is very important to water-ink animation. First, the animator will color one character on several celluloid layers. Second, the animation photographer will shoot each celluloid cell. The cells will then be overlaid to form the composited shot and the composited shots assembled to form the scene.

After the invention of cel water-ink animation, the Shanghai Animation Film Studio successfully developed an animation style with the technique combination of water-ink painting and paper-cutting which called water-ink paper-cutting animation. And they successfully filmed three animation movies using this type of technique. The production of this

type of animation captures characters and backgrounds in separate levels: The characters were drawn on rice paper first and then hand torn along the profile leaving a slightly fuzzy edge; the background scenes use Chinese water-ink animation's hand drawn techniques on the rice paper. Lastly, through the use of stop motion filming, create a moving animation [32].

As technology improves in 21 century, labor and costs and be greatly reduced. Collaboration between man and machine leads to better animations created at a fraction of the cost [19]. In the late 90's, due to the economy and many others outside factors, water-ink animation development was essentially in a stasis. However, with the rise of digital technology, water-ink animation might be able to avoid many of the previous handicaps. The use of digital technology, making the water-ink animation production efficiency and greatly improve, enrich the film and television language, and expand display areas such as digital special effects, games and new media. Through the analysis of traditional and digital water-ink animation, we will have to insist the national cant while use the modern animation industry model for the country's cultural industry strategy [29].

3.1 Traditional Water-ink Animation Analysis:

3.1.1 Case Study I: *Tadpoles Looking for Their Mom* (1961)

In 1961, the first water-ink animation *Tadpoles looking for their Mom* was created in Shanghai Animation Film Studio [28], and introduced a new style that is special and unique to China. It not only makes static painting dynamic, it also keeps true to traditional cultural values, water-ink elements, and stylistics. The appearance signified a breakthrough in the



Figure 3.1: Tadpoles Looking for Their Mom

form of expression and aesthetic conception in animation.

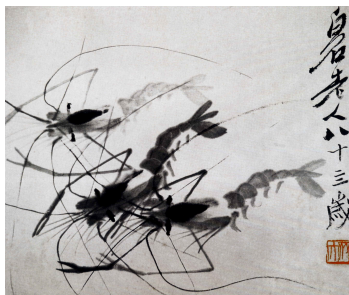


Figure 3.2: Qi Baishi's painting style of shrimp

The film was 14 minutes long in total, depicting Huizhen Fang and Lude Shen's fairy tale story. It is the only one with narration out of the seven movies. Its inspiration came from the fish and shrimp figures drawn by the legendary painter Qi Baishi [11]. The film begins with a Chinese art book opening, as pipa and quqin (musical instruments) melodies strike, separate pieces of water-ink paintings begin to appear, one by one. The animation adopts the ideas of expressing "likeness" from traditional Chinese painting. The

elements in the film do not have outlines and the animation's sense of movement is completely shown through the transitions and changes of ink density. These seemingly simple and casual ways of expression contains Chinese painting's ideology of "vivid expressions of life through shape" [20]. The story is about a school of tadpoles that were born and were looking for their mom. After mistaking shrimp, goldfish, crabs, tortoises and even a big catfish for their mother, the tadpoles eventually found their real mom - a frog. The story is a relatively simple-minded affair, it was an animation well received by the audience and was classified as a children's educational film [10]. The film received the Best Animated Film Prize at the First Hundred Flower Awards, as well as winning five international prizes [16].



Figure 3.3: Characters of *Tadpoles Looking for Their Mom*

3.1.2 Case Study II: *The Cowboy's Flute* (1963)



Figure 3.4: *The Cowboy's Flute* Created by Shanghai Animation Film Studio (1963)

In 1963, the water-ink animation *The Cowboy's Flute* was made by Tei Wei and Jiajun Qian of Shanghai Animation Film Studio. The production took over two years and the final film length clocked in at around 21 minutes. This film was inspired by the landscape painting style of artist Keran Li. The film captured the natural light in the Southern China as the background, portraying the interactions between the shepherd and cows with nature. It shows normally south China element in the film, like bamboo, mountains and falls. Starting from this animation, ink animations began to focus heavily on the aesthetics aspect of film. Animations were pushed to emphasize artistic values [10].



Figure 3.5: *The Cowboy's Flute* South China Landscape

3.1.3 Case Study III: *Bamboo Shoot Grown in the House* (1976)

In 1976, the film *Bamboo Shoot Grown in the House* was made by Jinqing Hu and Keqin Zhou of Shanghai Animation Film Studio. This is a new attempt that the directors combination of water-ink and paper cut technique to mimic the ink spread effects in the rice paper. The way is drawing characters with water ink on paper and then ripping off the edges to show the fuzziness of ink spreading.

The film adopted a technique to simulate real water ink spreading effect on rice paper, which, however, has limitations. Such animated characters are drawn on paper, it is difficult to implement complex body animation. For instance, when the character is expected to rotate, the animators simply rotate the whole character. It is unable to produce a more complex animation without a number of controllers on different parts of body.

These films all share common factors when analyzed through their art style, film length, and story content. Water-ink style mainly applies in short animation films. The length of these films are within 25 minutes, using Chinese landscape painting as backgrounds. The

themes of water-ink animations are mostly based on fairy tales, mythology and magical stories, reflecting on humans versus. animals, animals versus. animals, or relationship between sun, moon, and mountains. However, the story essentially reflects the relationships of humans, animals, and the nature in the stories are portrayed through personifications to represent the behaviors of these characters. For example of the *film Tadpoles Looking For Their Mom*, the main plot of the story is little tadpole looks for its mother, depicting the mother-son relationship as the story develops. Because of the different appearance between little tadpole and its mother, it mistakes its mother as goldfish, crabs, or even turtle. At the end of the story, little tadpole finds its mother. In this story, the close knit relationship of mothers and sons of humanity is reflected. Moreover, the water-ink animation, *The Deer's Bell*, narrates a story between a little girl and a lost baby deer. In a scene filled with lush mountains and vibrant waters, a little girl chases a little deer in a playful fashion. The ending where the deer must return to its family is also particularly touching.

3.2 Digital Water-ink Animation Analysis:

Ode to Summer, *The Legend of Shangri-la* and *INK*. These three are the most influential CG water-ink films that have both won accolades and awards internationally.

3.2.1 Case Study I: *Ode to Summer* (2003)



In June 2003, the Institute of Digital Media Technology Ltd produced a short 3D water-ink animation *Ode to Summer*. This film was the first CG animated short from China and was selected to be shown at the Animation the-

Figure 3.6: Digital water-ink style of Lotus in *Ode to Summer*

atre of Siggraph in the same year [7]. However, the film's content and length did not have much of a breakthrough when compared to prior water-ink animations. The CG short ended up three minutes and fifteen seconds. The story mostly revolves around a female character reading by the river and the key feature of the short is actually the 3D water-ink effect.

The beginning of the short film captures a piece of tradition Chinese water-ink lotus painting. A dragonfly flies on top of a pedal of the lotus flower. Then the background of the rice paper gradually fades out, and the camera starts spinning then transforms to a 3D visual effect with non rice paper environment.

3.2.2 Case Study II: *The Legend of Shangri-la* (2006)

In 2006, the Institute of Digital Media Technology Ltd produced another CG water-ink animation *The Legend of Shangri-La*, the story is adopted from the poem of the same title by the famous poet Tao Yuanming of Dongjin dynasty over 1000 years ago. This film inspired me to create thesis project's story from traditional poem.

In the poem of *The legend of Shangri-la*, the author point the story happened in Wulin, Chongqing, South China, also in the film, it shows the beautiful Pink peach blossom, and the peach blossoms is also commonly in Chinese ink painting and seen on the West Lake, so this element is also used in thesis project.

3.2.3 Case Study II: *INK* (2009)

CCTV's animation short *INK* received accolades such as the New York Festival's Gold World Medal of 2010 [4] and Singapore's PormaxBDAs Best Out of House Station Image

Promo and Best Animation Award 2009 [18] This film focuses on the diffusion and free movement of ink as it spreads throughout the water and firmly establishes the ink as the main focus. The elements of fish, dragon, great wall, characters, and architecture have all been magically represented through the dancing collaboration of ink and water [20]. The basic color in the animation of *INK* is black and white, but for some element, it choose low contrast red color, this is a good point that draw audiences attention through the movie.



Figure 3.7: Peach blossom in *The Legend of Shangri-la* (2006), in Westlake and Chinese painting



Figure 3.8: INK (2009)

4. The Disappearance of Traditional Water-ink Animation

Data from Shanghai Animation Film Studio shows that a production of water-ink animation costs four times as much as the average traditional animation. After 1979, the Chinese government policy change allowed individual and foreign animation companies to enter into the Chinese animation industry. Around the 80's, water ink animation's popularity and development declined due to the high development costs. The last water ink animation from that era was made in 1988.

4.1 The Reform and Opening in China

When the Reform and Opening period occurred in 1979, the Chinese government ceased all fundings to the Shanghai Animation Film Studio and allowed external investment and private companies entry to the animation industry. Many of the coastal cities of China started opening up animation studios aimed at helping foreign countries finish their animations using low cost labor. However, while this provided good income for experienced animators, much of the work was assembled overseas and did not contribute to the development of animations in China [15].

4.2 Globalization

From the 1990s, China's process of globalization continued to accelerate. As an integral part of Chinese culture, water-ink animation was inevitably affected by the changes as well. However, water-ink animation missed the opportunity to develop, and then it gradually

withdrew from the stage in the animation world.

At the end of 1980's and early 1990's, commercial animation from Europe, North America and Japan was imported to China. Since this new type of animation could be mass-produced, it quickly took over the market. Water-ink animation was under great pressure, especially since the high production costs of ink animation was four to five times as much as traditional 2D animation [33]. Also, policy changes to focus on mass production of televised animation in the 1990s lead to the disappearance of water-ink animations [8].

5. Design Idea and Work-Flow of June of West Lake

June Of West Lake is a two-minute water-ink style animated short, that uses 3D software and compositing to tell its story. The projects emphasis is on the realistic interaction between water-ink and Chinese rice paper.

5.1 Story

Many Chinese animations depict topics centering around traditional culture; the stories are often derived from myths, fairy tales, poetry, or religion. For example, I selected the *Tadpoles Looking For Their Mom* and *The Legend Of Shangri-La* as references. *Tadpoles Looking For their Mom* and *Feeling From Mountain And Water* have plot lines taken from traditional Chinese fables. *Tadpoles Looking For Their Mom* is depicted from Fanghuizhen shenlude's children story and the film story of *Feeling from Mountain and Water* is adapted from the Chinese culture tradition of respect for teachers. A CG animation short film of *The Legend Of Shangri-La* is adopted from the poem of the same title by the famous Chinese poet Tao Yuan Ming of the Dong Jin Dynasty from over 1000 years ago. The main theme of film *INK* is to represent the modernization of Chinese citizens. All of these topics contain Chinese elements, seek to showcase Chinese culture and represent the countrys identity through art.

The story of *June of West Lake* is adapted from the traditional Chinese poem - *At Down, See Off Lin Zifang At Jingci Temple* by Yang Wang-li over 800 years.

Now it comes, mid June on West Lake,

Displays a scenery to other months unknown.

Green lotus leaves outspread as far as boundless sky; lotus blossoms take from sunshine
a new dye.

The location this poem describes, the West Lake, is China's oldest and most influential historic lake. In 2011, the World Heritage Committee inscribed the West Lake Cultural Landscape of Hangzhou in eastern China on UNESCO's World Heritage List as a cultural property [26]. Choosing such a famous cultural scenic spot can let the audience who are familiar with this place and its culture accept this animation in a better way. After deciding the location of this story, I also added the elements that commonly appears in many related ink paintings - shrimp, lotus and peach blossom, etc, which enriches the feeling of water ink elements and the content of the animation.

In this animation, according to the Chinese poem, the story is told through to two shrimp reside in the West Lake; one cowardly, one brave. They discover a pink flower, unknown and mysterious. The shrimp go on an adventure to the deepest part of the lake to discover the origins of the flower. There, they must choose to confront the darkness of this part of the lake.

5.2 Art Style

Painting in China has a long history of evolution and refinement, one that is entirely unique compared to other schools and methods of painting.

First, the tools of Chinese and Western painting are different. Brush, ink, paper and ink slab are the main tools used and have been developing over thousands of years. As for the tools and material for Western painting, it consists primarily of brush, cloth paper,

colors, knife, and so on. Colors is one of the main materials for Western painting. It creates gradations to portray images through hue and light materials such as gouache, watercolor and oil painting.

Furthermore, the Chinese don't paint from life as Western painters do. They observe surroundings and paint what they understand. Chinese painters refer to the action of painting as writing. They take a writing brush to paint and paint in the same way as they write [1].

Water-ink animation is evolved from traditional Chinese aesthetics of water-ink painting. Therefore, the same color theories and creative perspectives are implemented in water ink paintings. Comparing traditional ink animation with animation in the same period, water ink animation is distinguished from other animations by its use of brush strokes, ink spread, and color gradients. This creates a much more complex image than simple solid colors.

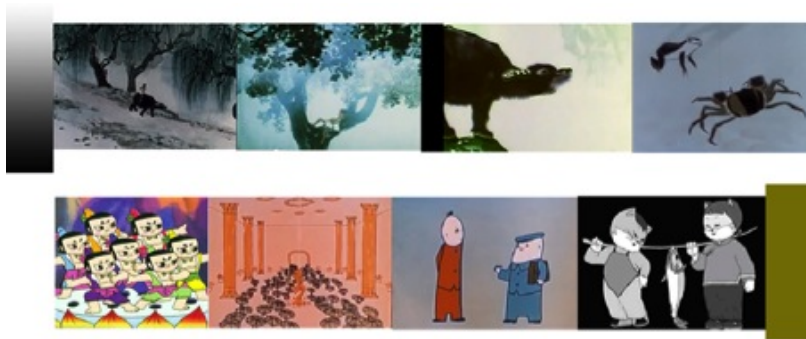


Figure 5.1: Style of Traditional Water-ink Animation vs Traditional Animation

5.2.1 Color



Figure 5.2: Colored Water-Ink Painting

Colors are often used for expression of emotion or states of mind. Water ink animation, although largely influenced by traditional Chinese paintings, has its own unique color theory. Black and white ink gradations are used to mimic the attributes of the ink. These include wet, dry, thick, and thin. It focuses strongly on using monochromatic color schemes. The ink is used as the base color and augmented with other colors of low contrast.

The emphasis of this kind of painting is not on realism, but rather on the feeling that painting evokes. An example of such is perfectly represented in the short *Feeling From Mountain and Water*. The entire film used colors sparsely and entire shots are usually composed by the variation in ink density. The uses of other colors are purely for a subdued embellishment. The color theory of water-ink painting is also used in this project.



Figure 5.3: Color Style of *June of West Lake*

5.2.2 Composition



Figure 5.4: Nymph of the Luo River is a painting by Gu illustrates a poem written by Cao Zhi (192-232). One copy is now held in the Palace Museum in Beijing, and another one is now at the Freer Gallery in Washington, D.C.

Chinese water-ink focuses on its expression and free strokes with the emphasis on emotion. On the other hand, Western paint lays stress on reproducing realistic portrayal, with the emphasis on rationality. This defines the different representations of Chinese and Western paint. Chinese paintings do not set a focus point on the painting or restrict its boundaries; the artists concentrate on their emotions and the need to move around in the painting, using scatter perspective to paint observable and unobservable objects.



Figure 5.5: Raffaello Sanzio da Urbino's "The School of Athens"

On the other hand, Western artists are more rational as they create their conceptual arts. They use perspective drawing and chromatology to express focal perspective and spatial transformation, in colors, in order to show a distinct dimensional image. For example, Raffaello Sanzio da Urbino's *"The School of Athens"* of the High Renaissance period and Vermeer's *"The Music Lesson"*.



Figure 5.6: Vermeer's *"The Music Lesson"*

In 1960, Shanghai Animation Film Studio introduced water ink to animation, creating two water ink animations called *Tadpoles Looking For Their Mom* and *The Cowboy's Flute*. From a perspective angle, *The Cowboy's Flute* perfectly presents the scatter perspective of water ink animation. In the film, *The Cowboy's Flute* incorporates concise and interesting painting features to shape the forms of the shepherd and the buffalo. The film uses a flowing camera movement to observe and showcase the scenery, freely focusing on objects. This allows for a free form observation of the environment and also showcases both the soaring mountains and the thousand foot drops of the cliffs. Furthermore, in the water ink animation's composition, they utilized multiple perspectives technique.

Composition perspective does not fit the aesthetic of Chinese painting, but for animation, it acts as an effective way of perspective. For example, through singular movements in the foreground and background, the entire scene can appear to be moving. Also, the

proportional ratios between people and objects are tweaked to show the difference in size, height, and space.

Tadpoles Looking For Their Mom skillfully combines the content and water ink's form, successfully reflects the water ink style, and achieves the initial hopes of marrying water-ink animated movement with multiple perspectives.

June Of West Lake contains the perspective of water ink painting and traditional water ink animation. In the film, the shrimp, stone, and grass's ratio is different than the actual objects in reality. This film focuses on the adventurous journey of two shrimp. Therefore, the ratio of the shrimp is deliberately enlarged during the production, in order to enhance the importance of the shrimp.

June Of West Lake is divided in two main categories: First, the pre-production work. This includes the animation script, storyboard, Maya modeling, Maya water ink textures, character rigging, and animation. Second, post-production mainly uses After Effects and Nuke to model water ink's effect on rice paper then edit of the film.

5.3 Storyboard

After the completion of the animation script, the storyboards were produced according to the story's development. The film consists of 14 camera shots on 5 main scenes.

14 camera shots are:

1) *Medium Close Up / Slow Zoom In to close Up shot*

In the first set of shots, the bamboo shot is divided into two parts. One with a fixed camera, a shot of drawing bamboo on rice paper, which is a Medium Close Up shot; The second shot shows the 3D view of the bamboo by rotating the camera after the completion



Figure 5.7: Storyboard of *June of West Lake*

of drawing bamboo, with a slow Zoom in to Close Up shot.

2) *Medium Close Up shot*

The second shot tells the story of a timid shrimp resting on the rock at the bottom of the lake, following the previous shot of bamboo leaves falling into the water. To show the timidity of the shrimp, I choose the Close Up shot, so that the audience can clearly see the shrimp rapidly escaping from the bamboo leaf when it is about to fall on its body.

3) *Wide Angle shot*

In the third shot, the timid shrimp rapidly retreats, and another main character in this animation - the brave shrimp - and petals that run through the whole film also appear in the same shot. In order to show a larger space, the camera chooses Wide-Angle shot.

4) *Close Up shot*

The fourth shot is a close up shot of the petals. The petals appeared in the third shot, then it uses a Close Up shot for the petals, the color of petals that uses in this shot is low contrast pink, this is to show that the petals have special meaning in the whole movie.

5) *Close Up shot*

The fifth shot shows the brave shrimp catching the falling petal, also showing a different reaction to the petals from the timid shrimp. This is done for the next shot Also, a deep lake adventure.

6) *Wide Angle shot*

In the sixth shot, the brave shrimp convinces the timid shrimp to go with it to the deep lake to find the flower that they had never seen before. However, since there is no dialogue through the entire film, it has to use of body language and audio to tell the story. In this shot, the brave shrimp points to the deep lake, heads towards it and the timid shrimp follows behind.

7) *Medium Close Up shot*

The seventh shot has a strong connection to the sixth and eighth shot. The entire shot is about the two shrimps moving and swimming, which indicates that this is a long journey. The two shrimp move one after another, which also fully brings out the two shrimps different personalities.

8) *Wide Angle shot*

The eighth shot shows that they have to go through a dark area, which is an important shot for the whole movie. In many other movies, black is often a symbol of danger. This animation is also using this technique to imply a potential danger zone. Here it is using a Wide-Angle shot. The dark area takes up two thirds of the screen in this entire shot, which

indicates that the rest of the journey is very hard. From the beginning of this shot, their action and movement slow down, showing that they are hesitant to move on.

9) *Medium Close Up shot*

In the ninth shot, another flower petal floats out from the dark side, but it slashed into two halves by the thorns on the lotus root. This scene scares the timid shrimp, which is also an important shot in the animation. The timid shrimp chooses to leave, and turns back and go home.

10) *Wide Angle shot*

The tenth shot follows closely to the ninth shot, but the Medium Close Up shot switches to Wide-Angle shot, fully consistent with the eighth shot. But in this shot, there is only the brave shrimp left. It uses a large shot with a two-thirds black screen, to depict its loneliness; then it swims to the dark areas alone, which shows its bravery.

11) *Medium Close Up shot*

The eleventh shot paves the way for twelfth shot.

12) *Point Of View shot*

The twelfth shot is an adventurous attempt, using a POV shot, simulating the shrimps perspective; its a shot with a pure 3D feeling.

13) *Medium Wide Angle shot*

The thirteenth shot shows how the brave shrimp overcomes all the difficulties, and swims to the surface. It uses Medium Wide Angle shot to give a strong sense of visual impact at the moment when the shrimp dashes out of the water.

14) *Close Up with Pull Back and Tilt Up to Wide Angle*

The fourteenth shot uses the Close Up with a Pull Back and a Tilt Up to Wide Angle

shot, when the brave shrimp reaches the surface. The camera slowly pulls back to show the whole beauty of the West Lake. Instead of using edits as in the previous scenes, this shot uses a long pull back and tilt up. This shot includes a shrimp, several flowering lotuses, bridges, pagodas, and finally the camera stops at the peach tree that contains the peach blossoms, the brave shrimp has searching for. This suggests that only by keeping up to the end can people see the most beautiful scenery, never giving up their goals.

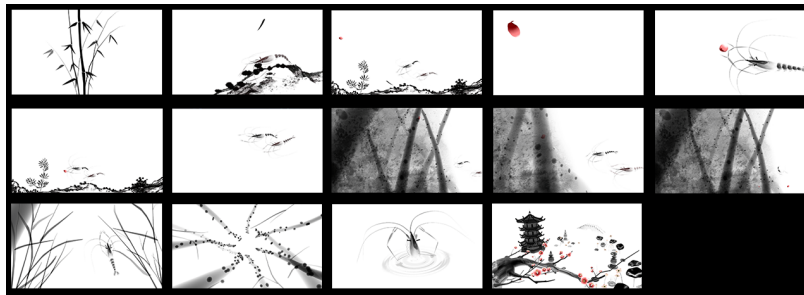


Figure 5.8: Camera shots of *June of West Lake*

5.4 Maya Modeling

During the production of traditional water-ink animation, every piece is painted by hand on transparent cells and then shot frame by frame by camera. However, in 2000, a few production teams started experimenting with digitally produced water-ink animation, using software such as Autodesk Maya 3d animation software, Autodesk 3ds Max and so on. In *June Of West Lake*, this project mainly uses Maya for three dimensional modelling but the stones in the film are created through 2D water ink painting.

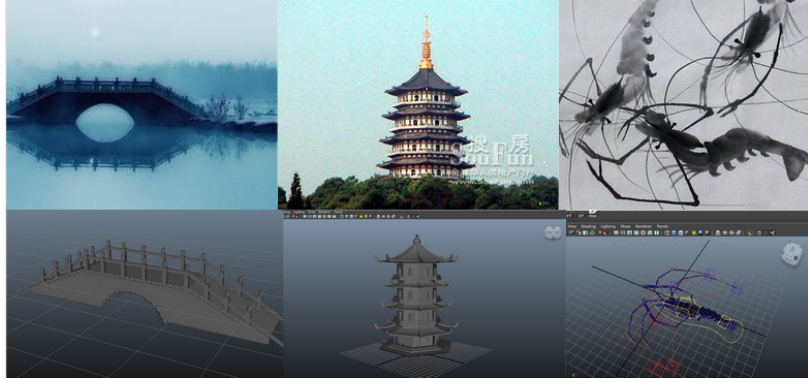


Figure 5.9: References and Modeling of *June of West Lake*

5.5 Maya Water Ink Textures

This is one of the most important parts of the project due to how it affects the style of the animation. This project's water ink texture production uses Institute of Digital Media Technology Ltds 2003 digital water ink animation, *Ode to Summer*, as reference. This process gives an object a surface shader's texture. Also in the transparency attribute, it changes from color to ramp and adjust the color from black to white. A facing ratio ramp is also created as a render pass to be used later in compositing.

Other reason that I selected this animation in my thesis because its lotus ink texture work and its outline of petals. Having never attempted this style of animation before, I researched a few methods that might achieve the ink outline effect:

- First method was to draw a texture in Photoshop, but I found that the texture only appears on one edge of the petal and has a completely solid appearance. This doesn't quite achieve the dispersed ink look I was looking for and in a 3D environment, this doesn't create a complete outline for the petals, the final result of animation appears far too computer

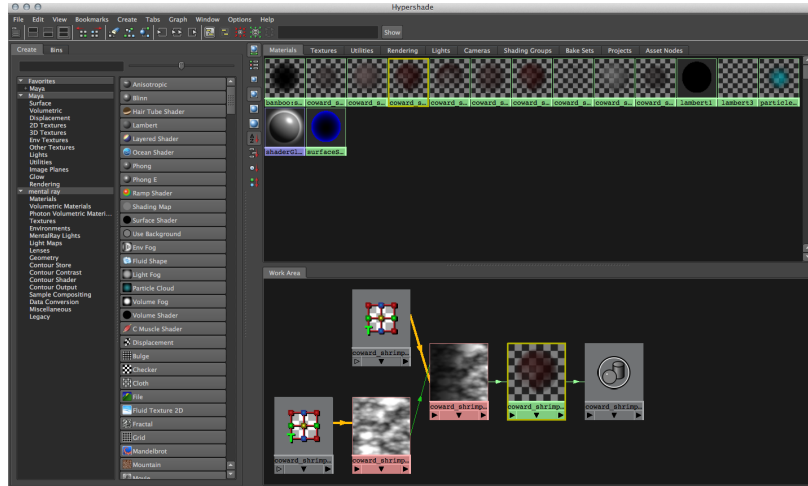


Figure 5.10: References and Modeling of *June of West Lake*

generated and was not desirable.

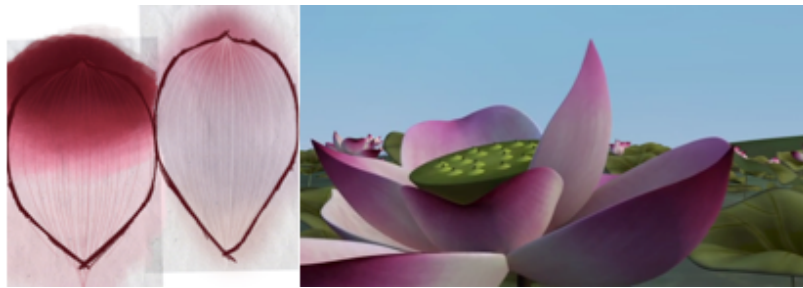


Figure 5.11: First water-ink texture test in Photoshop

- Second method was to use Maya toonline and use brush to draw ink outline for object, then render it as black line and composite it in After Effects. This test achieved the effect, but I felt the end result still wasn't detailed enough and the overall effect still had a computer-generated feel.

- Third method was used in the animation *Ode to Summer* was to duplicate a flower petal and create a shader which renders completely black. The petals were duplicated

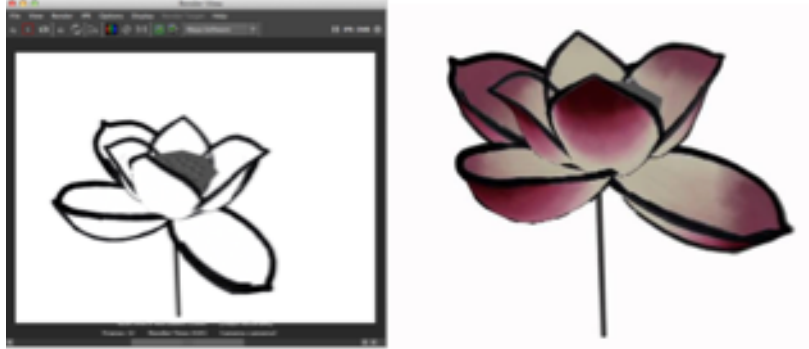


Figure 5.12: Second water-ink texture test in Maya Toonline system

and adjusted to be slightly larger than the originals. Normals were inverted and a black texture was applied. This combination of hand-tuned adjustment and three-dimensional representation of a brush stroke created a much more pleasing result. This is the method used for the flowers seen in this project.

5.6 Character Design and Rigging

Shrimp are the main characters in *Tadpoles Looking For Their Mom*. Its inspiration for the character designs is from the master ink painter Qi baishi. The first image is the painting Shrimp by QI BAISHI, and another image is the characters of *Tadpoles Looking For Their Mom* of Stamps published in June of 2013. This traditional water-ink animation still has a great impact in Chinese society. In this project, the digitized shrimp are shown on a rice paper background. The shrimp from *Tadpoles Looking For Their Mom* and Qi baishi's water-ink painting are used as references to the project.

Character rigging is an important composition of CG's animation product. Every step of character rigging affects the final animated effects. In this project, the main characters

are two shrimp, thus, during production, I used Maya's rigging system to control the details of the shrimp. As for the bamboo, flower pebbles, tree trunks, and other objects, I also used Maya's rigging system to set some rigging. As for the shrimp's rigging, first, I researched on the shrimp's activity under the water and the shrimp's activity on traditional water ink painting. Later on, with these references as the shrimp's moving patterns, I made spline skeletons for the shrimp's body. This technique shows the shrimp's flexibility under water. As for the shrimp's tentacles and claws, I used Maya's IK system. This achieves the use of one or two controls to command the shrimp's tentacles and claws. In regards to the flower petal, I did not use any rigging system. I layered the center of every petal on a flower's core. This allowed me to have easy access and control over the opening and closing of the flower's pedals. Regarding the bamboo, I used "blendshape" to control the swaying of the bamboo leaves in the wind. This technique was similarly used for other plant life swaying in the water.

5.7 Animation

Finding reference is pivotal when fine tuning animation. In this project, finding the right references became a big challenge. In the current water-ink animation, the shrimp references were based on the movements of the shrimps in Tadpoles looking for their mom. This helped make the shrimp look more lively and realistic.

5.8 Post Production

One of the biggest features of this animation is done in post production. This is when the effect of water interacting with ink takes place. At the start of the film, the rice paper is completely blank. As the bamboo is drawn a digital effect spreads the ink through the paper.

This effect will be created using two software applications, Adobe After Effects and Foundry' Nuke. An animated mask is created in After Effects to imitate the action of drawing the bamboo upon the rice paper. Then Nuke is used to create the effect of ink spreading through the rice paper' fibers.

5.8.1 First test:

The post production and compositing of the shrimp is different from the process of making other objects. For the shrimp, the creature itself is a partially transparent water animal. The head and upper body have darker colors and the abdomen, legs, and whiskers have more transparent colors. In water ink painting, artists emphasizes this distinguishing feature by using much darker ink when drawing the upper body and very light colored ink when painting the other parts. This technique helps achieve the partially transparent effect. Replicating this technique posed a difficult challenge for this project.

It first used the RGB matte pass in Maya to separate the parts of the shrimp. Using a facing ratio shader also allowed me to isolate the edges, which is used during the compositing process. Using a combination of these mattes and rotoscoping in Nuke, it was able to selectively blur and color correct the renders to achieve a high degree of control of the final

look.

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In practice, the shrimp's body material has been produced in Maya, but the qualities of water ink brush could not be solved. Parts of the brush can generate a light and diffused ink stroke because the brush is soaked with water, whereas the nib section provides a clear and dark stroke because there is more ink and less water in the bristles. Instead of the ink diffusion effects in the water, this method can create a soft feeling on the edge of painting. After analyzing the nature of this effect, I modify the original Nuke Script and made some improvement. These modifications achieved results closer to original intent.

5.8.2 Second test:

In the previous animation test, I had used an image of rice paper with a strong texture, which I had downloaded from the Internet. The rice paper background used in the new composition comes from a scan of real rice paper. During scanning, the lamp, combined with the reflective white backing under the lid of scanner will make the rice paper brighter, which loses the texture effects on the rice paper. Thus when scanning the rice paper, it is better to back the rice paper with a piece of black paper in order to better retain the realistic textured effect. For this project, the paper was scanned as a 16bit image at 1,200dpi to maximize image fidelity and detail.

The scan of the rice paper is read into Nuke and color corrected. This is used as the background of June of West Lake. Additionally, a high contrast correction is made to develop the detail of the texture.

This version is used to assist ink diffusion effect. When an object appears in the white

area, it will produce spreading effect; when an object appears in the black areas, they will not produce any change. When an object that possesses both intense and weak color appears on rice paper, the color of ink can be increased or decreased by using standard color correction workflows.

After the initial work, a pixel dilation node used to complete the ink spread effect. In real ink painting, the different intensities of brush strokes and varying amounts of water will produced different degrees of ink spread. In this animation, the highest degree of spreading ink appears in the head and body, and then it is the claws, while the lightest part is the tentacle.

To create the varying degrees of spreading ink, the intensity of the pixel dilation filters were controlled by various mattes and cascaded to produce controllable, procedural results. The number of cascaded nodes and the contribution of each to the final effect are adjusted by hand in order to best control the effects. With the shrimp's varying onscreen size and transition across several backgrounds, this degree of control proved invaluable to achieving the final work.

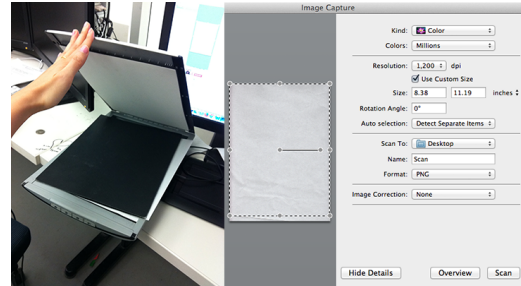


Figure 5.13: Method of scan rice paper Parameter of scanner

5.9 Editing

In June of West Lake, certain camera techniques not used previously in water-ink animations are used in this project. The medium shot, wide shot, close up shot, point of view shot and camera pull out are used here. In the animation editing, cutting on motion with matching editing was used to create smooth continuity of motion.

6. Methodology

This thesis explores the storytelling, technique and art value of Chinese water-ink animation and how critically acclaimed and representative pieces of work from the past can be combined to form a reference for future water-ink animators. The referenced work include shorts from 1960-1990 done by the Shanghai Animation Film Studio such as *Tadpoles Looking For their Momma* (1960) *The Cowboys Flute* (1963), *Bamboo Shoot Grown in the House* (1976). Also, representative pieces at the turn of the 21st century done by Chinese and European studios such as *Ode to Summer* (2003), *The Legend of Shangri-la*, and *INK* are also referenced.

6.1 Approach

This research aims to use digital software to create a new form of digital water-ink animation with realistic interaction between water-ink and rice paper.

Software:

- Maya work of models, texture and animated
- Nuke and After Effects were used to composite the animation, add the digital ink process, and sequence the piece.

Work Process:

Digital software: Maya, Nuke, After Effects and Photoshop.

Maya:

Models(not including background)

-Water-ink Material creation (by adding code to the surface shader RGB render in the object.

-Animation of shrimp, underwater vegetation, and camera

Nuke: Effects work on ink spread in the rice paper and ink spread timing control.

Photoshop: Animation background painting.

7. Implications of thesis work

This form of water-ink animation is suitable to produce water-ink animation with non-rice paper background, allowing more room to develop and express the transformation of ink in water. On the other hand, this style neglects the important elements of traditional water-ink painting; water-ink animator strongly wishes to show the water-ink effects and transitions on rice paper. Rice paper is a medium for water-ink painting. It expresses an important element and essence of water-ink arts. As Daqian Zhang said, rice paper is the lifeline of traditional paintings.” Water-ink animation is derived from traditional Chinese painting, thus it should reflect the essence of its origin, much like the paper-cut water-ink animation example of *Bamboo Shoot Grown in the House*. The animation directors want to simulate the effects of ink density transitions on rice paper by using the combination technique of water-ink and paper-cutting. Currently, computers can produce the basics of water-ink animation. The question is how would the new generation of animators maintain the traditional Chinese aesthetics and essence of water-ink animation.

8. Limitation

Digital Ink Spread Effects may lack the variety of real water ink spreading. Due to the specific brush strokes of the artists, real ink spread have many styles depending on the artist.

For the future, combining more Chinese elements with animation, and researching more ink spread effects for final composition.

9. Terms

Meishu Film: Through drawing or other types of artistic expression, character and environments are created. It is a highly suppositive form of art [2]. Taking what originally does not possess life and through film production and broadcast, give it the illusion of life [33].

CCTV: China Central Television.

Water-ink Animation: A particular type of Chinese animation, it was created in the 1960s [30], and declined in the end of 1980s [25].

Minzu This term refers to Chinas ethnic/national style in film study [27].

Chinese Animation style: the Meishu style animation films in China [3].

Water-ink Painting: Water-ink painting is a Chinese traditional aesthetic. Utilizing brushstrokes of the Chinese brush and ink, characters, birds, and environments are expressed [30].

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